SDMS Doc ID 2014631

2014631

WR-3c Perchlorate - Advances in Remediation, Technologies, Human Health Risk Assessment, and Latest Analytical Techniques

Toxicity and Risk Assessment of Perchlorate: A DOD Perspective

Track: Cleanup, Remediation & Closure

Submission/Review Cycle: Draft Submission (Cycle 2)

David R. Mattie , AFRL/HEST

Abstract:

Abstract: Perchlorate, the stable anion of ammonium perchlorate, is found in groundwater and drinking water throughout the United States. The contamination is the result of the use of ammonium perchlorate in solid rocket fuel of rockets and missiles. Perchlorate competes with iodine for uptake into the thyroid gland resulting in iodine deficiency and hypothyroidism at large mg doses. Sodium or potassium perchlorate has been used for over 50 years as a drug in the clinical setting (doses up to 900 mg/day) to treat hyperthyroidism due to Graves Disease or to reverse the side effects of administration of amiodarone. The initial provisional reference dose (RfD) for perchlorate was 4 ppb in 1992 based on inadequate toxicity data and uncertainty factors equal to 1000. A battery of toxicity studies has been conducted to collect data necessary for the determination of an oral reference dose for perchlorate. The design of the studies was based on the mode of action of perchlorate. Data now exists for human exposure in the workplace, in exposed populations and from volunteers in clinical studies. The rat is more sensitive to perchlorate than the human. Use of rat data and application of precursor effects (iodine inhibition and hormone changes) seen in rats at low levels of perchlorate resulted in the low proposed RfD. Use of human data supports an RfD in the range of 60 to 100 times higher than the value proposed (1 ppb) in the EPA draft document released in January 02. The current status of perchlorate will be presented.

Copyright © Air & Waste Management Association